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ABSTRACT

To examine the success of the Federal Communications Commission's (FCC) 1982 decision not to select a standard transmission system for AM stereophonic broadcasting (instead leaving it to the marketplace), this paper documents and analyzes the first 7 years of the AM stereo marketplace. Following an explanatory introduction, the paper's first section examines the process leading up to the landmark 1982 decision. The second section examines in detail events in the AM stereo marketplace from 1982-1988. The third section is a summary of the complicated maneuvers of the companies involved, and the fourth section draws conclusions. Ninety-six references conclude the paper. (SR)

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THE FCC'S AM STEREO EXPERIMENT: SEVEN YEARS IN THE UNCHARTED BROADCAST MARKETPLACE

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by

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For three years (1977-1980), the FCC worked in traditional manner to select a standard transmission system for AM stereophonic broadcasting. In 1980, the FCC picked a "tentative" standard from among five competitors. Industry dissent prompted the Commission to reconsider. Only with color television had the FCC made and reversed a standards choice. Even then, the Commission selected another system. With AM stereo, no other system was ever picked by the government.

For the first time, the Commission questioned its proper regulatory role. The FCC in 1982 changed history by not setting a standard, instead leaving the decision to the marketplace. The purpose of this paper is to document and analyze the first seven years of the AM stereo marketplace in an effort to determine whether or not the FCC's plan has worked.

THE FCC'S AM STEREO EXPERIMENT: SEVEN YEARS IN THE UNCHARTED BROADCAST MARKETPLACE

In 1977, the Federal Communications Commission (FCC) began an inquiry into the feasibility of AM stereophonic broadcasting. For five years the Commission deliberated before finally deciding in 1982 not to select a single system AM stereo transmission standard. Instead, the FCC revealed plans to allow AM stereo transmission, but to leave the standards decision with the broadcast marketplace (FCC, 1982, p. 17).

The AM stereo marketplace decision marked the first time in FCC history that no technological standard would be set by the government. In the Report and Order, the Commission described the move as a "bold, new step" (p. 17). Sterling (1982) agreed, calling the FCC's AM stereo decision "a benchmark" in the "regulation of changing technology" (p. 137). Except for the color television decision, the FCC had historically acted diligently and decisively in transmission standards proceedings. Even in 1953, when the FCC "abandoned its earlier approval the CBS color system and adopted the National Television Standards Committee system" (Garvey, 1980, p. 516), the Commission admitted error and stood its ground. As in the case of color television, the Commission at one point chose a standard system, but quickly rescinded. However, the FCC never picked a replacement.

Neither the FCC or the broadcast industry could accurately predict the course of events which would shape the AM stereo marketplace. The only available yardstick was the pre-regulation

period of the infant broadcast industry of the early 20th century. Recognizing the need for strict regulation the broadcast industry asked the federal government to intervene, but only if the industry's "interests" were "guaranteed" (McKerns, 1976-77, p. 131).

The remarkable and surprising decision came at a critical time for AM radio broadcasting. During the latter part of the 1970s and the first half of the 1980s, AM offered few aesthetic characteristics attractive enough to enable effective competition with FM. AM was literally running headlong into extinction. In less than two decades FM reversed AM's historic hold on the audience ratings. By 1985, FM garnered at least 70 percent of the total radio audience. Arguably, a 30 percent audience share was still substantial. Yet, having had and lost some 40 percent of its listeners in less than 20 years was an awesome statistic for AM operators to swallow. Some experts predicted that AM would have no listeners by the end of the 20th century if the trend were not reversed.

AM owners and operators initiated several remedies; none of which appeared to make much difference. The most popular solution was resorting to formats less dependent on sound quality than music. Talk and news began to show up on the AM band in great quantity. While these voice-only formats did not assist AM by recapturing lost audience shares, there was some success in leveling off the attrition rate. Only one permanent answer seemed logical -- narrowing the sound quality gap between FM and AM with stereo.

Purpose

The purpose of this paper is to document and analyze the first seven years of the AM stereo marketplace in an effort to determine whether or not the FCC's plan has worked. In order to place the

significance of the Commission's actions in proper perspective, it is necessary to briefly examine the process leading up to the landmark decision of 1982.

The FCC's AM stereo marketplace decision

When the FCC began its study of AM stereo in 1977, few would have guessed the AM stereo process would be affected so much by the FCC's changing philosophy. Throughout the proceeding, the FCC's objective was to pick a technological standard:

> The object of this Notice is to determine if there is an interest and need for a service of stereophonic broadcasting by AM stations, and if so to develop a record that will assist the Commission in proceeding with the issuance of a Notice of Proposed rulemaking, proposing standards for such a service. (FCC, 1977, 34910).

Five AM stereo transmission systems were proposed by five manufacturers: Motorola, Magnavox, Belar, Harris, and Kahn/Hazeltine. By September 1978, the FCC determined "that rules should be proposed for the transmission of AM stereo," expressing doubts about which of the systems might best satisfy the needs of broadcasters (FCC, 1978, p. 4). The Commission added: "Resolution of these matters to the Commission's satisfaction is necessary before any standards are to be adopted" (p. 4).

On April 9, 1980, the FCC "tentatively" selected the Magnavox system" as the industry standard' (FCC, 1980, p. 2). However, numerous "petitions and pleadings" convinced the Commission to reconsider the Magnavox decision (p. 2). Still, the FCC was confident "a single system would better serve the public interest" (FCC, 1982, p. 5). Indeed, broadcasters who filed comments with the FCC wanted the Commission to pick an AM stereo standard (p. 7).

In the public interest

Between 1980 and 1982, the FCC began to take a serious look at

its regulatory role. After almost two years of deliberation, the FCC announced on March 4, 1982, that no single system for AM stereo would be picked by the government. Instead, the matter would be placed in the hands of the marketplace (p. 16). The FCC explained in its docket that selection of only one system would be highly tenuous" (p. 9). Further, the Commission indicated that public interest would perhaps be better served by allowing the consumer to have a more direct impact on the process:

> It clearly represents a change from tradition. However, it signifies a more effective and more efficient approach to achieving the public interest goals of the Commission. Although some costs may be incurred as a result of the Commission moving in this direction, the potential benefits are substantial and should not be ignored. Therefore, we believe that pursuing the course of action set forth herein best serves consumer well-being and furthers the Commission's mandate to regulate in the public interest. (p. 17)

Sterling (1982) observed: "On the surface, the decision appeared to be a collective throwing up of hands, as the Commission staff admitted its inability to make a clear-cut choice among the systems, all of which were compatible with existing AM technology" (p. 137).

The Commissioners' individual views of the marketplace decision

Abbott Washburn, the lone dissenter among the FCC Commissioners, said the FCC's responsibility as a government agency was to select a system as it had with FM stereo (p. 45). Though a supporter of radio deregulation, he believed the FCC should set technical standards (Washburn: Proud, 1982, p. 67) as it had "for over 50 years" (FCC, 1982, p. 45). In addition, he noted: "The data and analysis we need to set a standard in AM stereo are before us. I dissent to the majority's unwillingness to make the choice which would have assured a national standard" (p. 45). Because of the incompatibility of the five AM stereo systems, Washburn believed the public interest would be better served by picking a standard (pp. 44-45).

Commissioner James Quello voted for the approach (Quello: Worried, 1982, p. 124), despite considering the marketplace incapable of determining which system should be the standard for AM stereo. He stated: "To expect the American public to select a nationally compatible AM stereo system in a reasonable period of time from among even the five systems now before this Commission is sheer folly" (FCC, 1982, p. 42).

Quello emphasized that his disappointment with the Commission's mishandling of the AM stereo situation led him to vote for the marketplace to prevent further damage from occurring:

> I am appalled that it has taken this Commission five years to decide that it cannot decide this issue. We have vacillated, temporized and rationalized this matter until I believe the Report and Order is correctly stating that a viable standard can no longer be set. The Commission's credibility has been damaged sufficiently to bring into serious question whether we can fairly and in a reasonable period of time act responsibly to provide the basis for a compatible AM stereo system for this country. (p. 42)

Commissioner Joseph R. Fogarty backed the marketplace due to the FCC's failure to stick with the Magnavox decision:

> We botched up AM stereo. On the advice of the experts we had here at the Commission, we selected Magnavox a couple of years ago. At that time, I was convinced it was correct. . . . we really weren't sure, so we delayed the delivery of AM stereo; and now we've left it up to the marketplace. Well, this one was too close to call. (Fogarty: Favors, 1982, p. 69)

Fogarty explained he would have supported a system obviously superior to the others (p. 69). Commissioner Henry Rivera concurred:

> Unless it can be demonstrated to me that the FCC can make a better decision than the marketplace, I will go with the marketplace because I think it works. I don't buy the argument that unless we set a standard it won't get done. (Rivera: Pessimistic, p. 75)

A strong marketplace proponent, Commissioner Anne P. Jones was pleased with the decision because a standard would have eliminated future technological improvements:

> If we don't impose standards, there may be systems other than the

> five we looked at that can come in and be considered. So, if we don't set standards, new players can come in. And, the new players may improve the system. If we put a standard on some technology, there's no real incentive to improve on it. (Jones: Staunchly backs marketplace philosophy, 1982, p. 70)

Commissioner Jones was hardly alone in her views. The Commission was Chaired by free market supporter Mark Fowler, who led the FCC's move to deregulation. Fowler strongly believed in moving toward the print model. Fowler explained: "The day will come when we will regulate only technically and only in the narrowest sense, and treat everything else as newspapers are treated. The antitrust laws will apply" (FCC prescribes major treatment for AM ills, 1986, p. 35). Fowler's legal assistant explained further:

> The present FCC's approach to mass media best can be capsulized by three main objectives. First, to create to the maximum extent possible an unregulated, competitive marketplace environment for the development of telecommunications. Second, to eliminate unnecessary regulations and policies. Third, to eliminate government action that infringes the freedom of speech and the press. . . . the litmus test is whether a rule of policy would or could be imposed on newspapers, books, and magazines. If not, it must be eliminated. (Herwitz, 1985, p. 185)

Despite the confusion, the Commission appeared confident the best system would ultimately win favor with the marketplace. And, the FCC emphasized its major responsibility would lay in making sure that all systems complied with federal technical regulations. AM stations were allowed to begin stereo broadcasting 60 days after publication of the docket in the Federal Register (FCC gives up, 1982, p. 36).

Initial industry response to the marketplace

The reaction to the decision was varied. Some analysts thought that even with AM stereo, a long time might pass before any progress could be made against FM (Hedegaard, 1982, p. 49). Others adopted the attitude that AM stereo was a reality for better or worse (Week one of AM stereo. 1982, p. 58; Lineback, 1982, p. 48; Radio 1980, 1980, p.

100; Stereo AM: Coming soon, 1982, p. 58), but that the FCC "copped out" by not picking one AM stereo system (Salsberg, 1982, p. 6).

Seven years in the AM stereo marketplace: 1982-1988

The Commission continued its hands-off policy, and the fate of AM stereo remained in the hands of the marketplace after more than seven years. The FCC's plans for a marketplace solution were still not realized. Occasionally, promise for a marketplace solution surfaced, only to be replaced by disappointment.

1982

Though the FCC refused to set a standard, the most important fact was that AM stereo broadcasting was a reality (AM stereo goes on the air, 1982, p. 24). Several AM stations gambled and picked a system, but the majority of AM stations declined to go stereo. Potential AM stereo receiver manufacturers were hesitant to go into production until some trend could be seen with stations' selection of a stereo system. On the other hand, station owners preferred to wait and see which companies would build receivers (Petras, 1982, p. 22).

During the spring and summer of 1982, General Motors' Delco division began testing procedures to determine which of the systems it would choose to be compatible with its receivers (Hall, 1982a, p. 1; Stereo showdown?, 1982, p. 7). Industry principals predicted that Delco's decision would have enormous impact upon the ultimate determination of a de facto AM stereo system standard (Abramson, 1982, pp. 35, 75). Thus, Delco became the first real hope for AM stereo under the marketplace ruling.

Meanwhile, AM's loss of audience numbers to FM continued. Between 1979 and 1982, the FM percentage grew from 52 to 63. Rather than gamble on AM stereo's uncertain future, AM executives approached

the problem by altering or changing formats completely. Many were stalling in the hope receiver manufacturers would force the early establishment of an industry standard (Josephson, 1982, pp. 45, 119).

As 1982 faded, Delco continued its quest to select the system to which it would align its receiver compatibility. The process was delayed considerably while Delco worked out details to prevent any possible antitrust violation associated with the selection of one system (Delco AM stereo tests near end, 1982, p. 22).

Finally, in December 1982, Delco announced plans to build Motorola-compatible receivers. Both Harris and Magnavox accused Delco of unobjective testing. The impact of Delco's decision on AM stereo development remained to be seen (Hall, 1982b, p. 11).

As 1982 ended, no industry AM stereo standard was in sight, and audience shares continued to shift toward FM. During 1982, FM gained four more percent of the total radio audience to finish the year with 63 percent of all listeners (Fall RADAR study finds FM continuing to grow, 1982, p. 11).

1983

Motorola announced in January 1983 that since the Delco action, system orders increased 300 percent (AM stereo on parade at CES, 1983, p. 116).

While Delco may have been AM stereo's first hope for a marketplace solution, the second was multisystem decoders. Both Sony and Sansui introduced receivers with the capability of decoding the signals of all the systems. The entrance of Sony and Sansui lent some credibility to the marketplace position argued by Commissioner Anne P. Jones. Jones had long contended technological standard-setting eliminated incentive to improve upon technology. Had an AM stereo

standard been set, players such as Sony, Sansui, and others would have never gotten a chance to compete (Norberg, 1984, p. 30).

Harris, Magnavox, and Kahn were all happy to have the multidecoders on the market, but Motorola was less than enthusiastic.[2] The company had already landed a prize with Delco's decision. Many industry officials were afraid the consumer would not be attracted to multisystem receivers because the price was considerably higher than single system decoders (Multisystem AM stereo receivers, 1983, p. 95; Technological cornucopia at NAB '83, p. 86).

On August 17, 1983, the FCC ordered Harris Corporation to take its system from the marketplace and to instruct the 65 stations using the system to stop stereo broadcasting by September 1. The FCC charged and subsequently punished Harris for changing its system after gaining approval in 1982 (FCC pulls plug on Harris stereo, 1983, p. 35).

1984

Thanks to both the Delco decision and Harris' problems, Motorola began to forge a lead in the AM stereo race by the spring of 1984 (The AM stereo marketplace struggles for a standard, 1984, p. 84). In addition, Chrysler decided to put Motorola-only radios in its cars (Motorola appears to be leading in AM stereo race, 1984, p. 44).

With little fanfare and no public announcement, Magnavox joined Belar as an AM stereo casualty. After two years under the marketplace, Magnavox had but six stations on the air and reportedly had stopped active promotion. Both Kahn and Harris were still engaged in earnest competition with Motorola. Though damage had been done by the FCC's reprimand of Harris, a company spokesperson said a comeback was in progress since reinstatement:

> Before that problem surfaced we were Number 1 without a shadow of a doubt. Since the turn-on this January I'd rate our comeback from a

> reasonable to good. We're in a horse race, with the three of us sitting at 100 stations apiece. (p. 44)

Evidently, Kahn believed that the system to beat was Motorola, and launched a massive campaign against the company. Because of Motorola's alignment with General Motors and Chrysler, and because of Kahn's lack of compatible receivers, the battle turned to a competition between single-system and multisystem receivers (The AM stereo question: Motorola, 1984, p. 95).

By September 1984, automobile manufacturers were becoming more receptive to AM stereo (Gave, 1984, p. E-22). General Motors, Chrysler, and Ford were either already installing Motorola-only receivers, or planning to do so immediately. At least 175 stations were broadcasting with Motorola's C-QUAM in 1984, 100 with Harris, and 90 with Kahn (AM stereo makers, 1984, p. 56). Motorola profited further in October 1984 when several major audio manufacturers, including Pioneer, Marantz, and Concord, announced they would build Motorola-only receivers (Sweeney, 1984, p. 73).

In November 1984, Harris joined Belar and Magnavox as marketplace casualties (Two left, 1984, p. 7). Penalized on August 17, 1983, for changing its system after FCC approval (FCC pulls plug, 1983, pp. 35-36; Holland, 1983, p. 14), the company was not allowed to sell any of its AM stereo equipment for a few months. As a result, Harris lost valuable ground to Motorola. By the time Harris announced its withdrawal from the competition, plans already existed to make its systems Motorola-compatible (Two left in AM stereo, 1984, p. 40).

Kahn believed Harris and Motorola had joined together in violation of antitrust laws (Kahn, 1984, p. 26; FTC said to be, 1985, p. 42), and indicated legal action would be a possibility: "We are consulting with attorneys to determine what legal steps, if any, should

be taken" (Harris throws its weight, 1984, p. 109).

By the end of 1984, about 200 stations were equipped for Motorola, and an estimated 120 installed Kahn. However, with the Harris stations in its camp, the Motorola total was expected to exceed 350. As expected, Harris officially joined Motorola in a licensing agreement in December 1984 (p. 109). Harris officials underscored the importance of the deal with Motorola. A Harris vice president said the agreement would help establish AM stereo "as a popular new broadcast technology and consumer medium" on a level with FM stereo (Harris Corporation, 1984, p. 1).

Harris officials also stated that a similar arrangement was proposed to Kahn without results. In addition, Harris emphasized that the company would be only one of several manufacturers to sign licensing agreements with Motorola (p. 1).

The year 1984 was the first since 1979 that AM lost no ground to FM, with listenership remaining stable (Staying up, 1984, p. 7).

1985

In January 1985, Leonard Kahn issued a formal complaint to the Federal Trade Commission (FTC) in regard to possible Motorola/Harris antitrust practices. By March, the FTC launched a formal preliminary investigation, but would make no other comment. According to Kahn, his statement to the FTC mentioned several illegal activities. The main complaint centered on the Harris/Motorola licensing agreement. Kahn commented: "It's like ABC and CBS joining together and saying: 'We are no longer going to compete for the advertisers' buck'" (FTC said to be investigating, 1985, p. 42).

As the end April 1985 approached, Motorola totaled 250 stations, including Harris conversions. In comparison, fewer than 100

remained with Kahn (AM broadcasters, 1985, pp. 95-96). Major cornerstones in Kahn's camp, stations in Chicago, Los Angeles, and Toledo, changed to C-QUAM. All explained that listeners with AM stereo receivers could not get stereo broadcasts. The listeners did not understand the compatibility problems and held the stations responsible (Ronaldi, 1985, p. 4; Popular demand, 1985, p. 7).

The long fight was taking its toll on broadcasters who wanted to stop FM's domination. Industry talk speculated that Motorola would soon become the standard (AM broadcasters, 1985, pp. 95-96). With 16 major producers of receivers in its camp, Motorola solidified its position as the future standard (NAB '85, 1985, pp. 58, 60).

By the middle of June 1985, FM's audience shares grew larger than ever. From 1984 to 1985, FM increased its already substantial lead from 68 to 71 percent (FM share up, 1985, p. 1).

In August 1985, Leonard Kahn continued his attack on the Harris and Motorola arrangement. Kahn contended Harris-equipped stations were "pressured" into aligning with Motorola rather than demanding a refund on the investment (Kahn fights for stereo AM, 1985, p. 31). Harris Corporation officials maintained the move was in the best interest of AM stereo (p. 31).

The FTC ended its nearly year-long investigation of Motorola on December 1, 1985, with no comment. Kahn, disappointed with the lack of FTC action, indicated a civil antitrust suit against Motorola was still a possibility (Scratch one, 1986, p. 7).

1986

Chris Payne, Motorola's AM Stereo Manager, said the FTC sent his company a letter in January 1986 which contained information that no plans existed for "further action" (Wytkind, 1986a, p. 3).

In April 1986, Kahn accused Motorola of an FCC technical rule violation (The AM stereo fight continues, 1986, p. 68). In response to Kahn's complaint to the FCC, Motorola denied any wrongdoing (C-QUAM violations alleged, 1986, p. 1). Company officials considered the situation another in a string of Kahn ploys designed "to stop Motorola at any cost" (The AM stereo fight continues, 1986, p. 68). The FCC dismissed the charges in July 1986 without releasing test results (FCC acquits C-QUAM, 1986, p. 1).

Though all of Kahn's allegations were dismissed, Motorola's progress had been slowed. Four years into the battle, only 288 stations installed Motorola AM stereo equipment, or 6 percent of all AM stations. By contrast, Kahn had 86 stations with his system. Kahn's chief advantage proved to be his infiltration into major markets. His primary disadvantage was that no receiver manufacturers were licensed to build Kahn-compatible receivers. Only two companies, Sony and Sansui, marketed multi-receivers. At least 24 companies were producing Motorola receivers, with about four million sets "in the hands of consumers or in the distribution pipeline" (p. 68).

In May, Kahn could for the first time announce that a firm (Japan's Tohtsu Co.) would market and distribute his AM stereo transmission system. Motorola for some time had marketed its system in association with four companies: Harris Corporation, Delta Electronics, Broadcast Electronics, and TFT (Wytkind, 1986b, p. 11).

Clearly, though, the AM stereo marketplace was beginning to lose even its small amount of momentum. Something had to be done to save AM stereo, and midsummer 1986 proved to be most interesting. Texar, a Pennsylvania electronics manufacturer, announced plans in July to petition the FCC to reconsider its stance and select an AM stereo

standard (Hughes, 1986a, p. 1; AM stereo support eroding, 1986, p. 5). Texar President Glen Clark acknowledged the FCC's intent to filter out a de facto standard in the marketplace. However, Clark believed both Kahn and Motorola had the financial backing to compete indefinitely. Clark said his firm stepped in to help save AM stereo.

Clark explained that only about 10 percent of all AM stations had decided to broadcast in stereo. Because of such a small number, manufacturers such as Sony and Pioneer had ceased building AM stereo receivers. Clark added: "It's not enough for some stations to do well with AM stereo. The truth is that everybody's got to do it. It's got to be a national effort" (Hughes, 1986a, p. 1).

Sony, Pioneer, and other manufacturers explained their reluctance was not based on lack of a standard, but on lack of demand. It could be argued, however, that product unawareness presented a greater problem (p. 4).

Texar intervened to inject new life into an AM stereo "battle that no longer represents a measure of the effectiveness" of the FCC's marketplace (AM stereo support eroding, 1986, p. 5). Texar was scheduled to file in the middle of July, but delayed to put the petition "together very carefully" (p. 7). Texar officials "stressed" no one system would be favored (p. 7).

Leonard Kahn, meanwhile, filed a Freedom of Information Act (FOIA) request with the FCC's Field Operations Bureau (FOB) to acquire results of the FCC's field tests which cleared Motorola of alleged technical violations earlier in the year (Hughes, 1986b, p. 3). In addition, Kahn questioned the FCC's testing procedures, particularly the FCC's use of field rather than laboratory tests. He contended the FCC neglected to observe specific Commission rules in reaching its

decision by utilizing field tests which were both "unscientific" and "subjective" (p. 3). The FCC responded that Kahn's charges of on-air interference warranted the use of field testing. Laboratory testing, the FCC said, would not properly address the technical issues raised by Kahn. Kahn also accused the FCC of "alerting" the test stations prior to observation, causing "distorted" and "useless" data (p. 3).

In spite of Kahn's persistent allegations, Motorola continued to flex its muscles. Between March and August 1986, 10 more companies were licensed to build C-QUAM compatible receivers -- raising the total from 30 to 40 (Motorola Inc., 1986a, p. 1; Motorola Inc., 1986b, p. 1).

In September, the FCC released the results of its field tests. The Commission revealed that in addition to testing Motorola's system, Kahn's also was examined. Both systems were found to be barely above required "emissions limitations" at two separate stations in the Washington, DC, market (Hughes, 1986c, p. 3). However, upon testing and evaluating 23 Motorola-equipped stations, the Kahn "complaint cannot be substantiated" (p. 3).

On September 26, 1986, Texar President Glen Clark and Senior Design Engineer Dave Van Allen personally delivered the petition to the FCC (Hughes, 1986d, p. 1; FCC asked to choose AM stereo standard, 1986, p. 35). Meanwhile, a possibly greater development was in progress. The National Telecommunications and Information Administration (NTIA), telecommunications policy division for the Executive Branch of the Commerce Department, was readying an AM stereo report of its own (FCC asked to choose AM stereo standard, 1986, p. 35). FCC Mass Media Bureau Chief James McKinney admitted Texar's petition would have faced immediate rejection without the NTIA's intervention. Instead, the FCC placed Texar's petition on hold until after the NTIA report (p. 35).

1987

The NTIA study was intended to accomplish either of two general goals: (1) to determine if a de facto AM stereo standard existed; and (2) to decide whether the FCC should reconsider its marketplace stance (Hughes, 1987a, p. 8). The report, which was eventually released in February, achieved neither result. Instead, the NTIA recommended a study into the feasibility of requiring all AM stereo receivers to be multidecoders. In reaching its decision, the NTIA reasoned the marketplace had reached a "stalemate" (Zavistovich, 1987a, p. 1).

Two basic explanations were cited by the NTIA for its conclusion. First, AM owners and operators demonstrated a reluctance to implement AM stereo because of the low number of receivers on the market. Secondly, those same executives were afraid of making the wrong choice between Motorola and Kahn. To better facilitate the introduction of AM stereo, the NTIA believed more stations should make the move to stereo in order to accomplish mass promotion.

The NTIA solution was more in alignment with the Press Broadcasting petition than with Texar's. Leonard Kahn, displeased with Texar's petition, was satisfied with the NTIA's commitment to multisystem decoders:

> We're delighted that the NTIA has now reconfirmed the government's support of free competition. I hope that Motorola will graciously accept the fact that they have failed in their attempt to gain a de facto monopoly and join Sony and Sanyo in the development of multisystem integrated circuits. (p. 3)

Motorola officials were not open to the NTIA's ideas. Chris Payne, Motorola AM Stereo Manager, said the NTIA's proposed solution was "like being in the eighth inning of a ball game, the score is 30 to 1, and NTIA decides to put its money on the team that has 1" (p. 3). AM stereo receiver manufacturers, content to build Motorola-only

receivers, were also disappointed with the proposal and opposed the plan (Zavistovich, 1987a, pp. 1, 7).

By April 1987, the FCC was rumored to be almost ready to act on the Press Broadcasting and Texar petitions, as well as the NTIA study. Bill Hassinger, an FCC engineering assistant, said the Commission's response would "be our version of how the world looks" (Hughes, 1987b, p. 1). However, the FCC elected to wait on the NTIA's results from its multimode feasibility study (p. 1).

Motorola, meanwhile, was concerned about the NTIA's notion of a stalemated AM stereo marketplace. Motorola officials emphasized that with 350 U.S. stations equipped with C-QUAM stereo, over 10 million Motorola-only receivers, and 40 receiver manufacturers in its camp, little chance existed for a stalemate (p. 4). Kahn had no receiver manufacturers and less than 100 stations.

NTIA testing was delayed because Motorola refused to provide equipment for a study with unspecified procedures (Zavistovich, 1987b, p. 1). In June, Motorola finally consented to lending its system for the tests. However, Frank Hilbert, Motorola AM Stereo Manager, said his company relented conditionally and because the NTIA was a government agency:

> Because the NTIA has no test plan or has not made it public, and is not allowing witnesses, Motorola will disclaim any results, regardless of how they will turn out. There is no need to test a technique which has resoundingly been rejected by the marketplace over the last five years. (Zavistovich, 1987c, p. 10)

The NTIA completed its report on July 20, 1987 (NTIA has AM study, 1987, p. 15), and released it on August 12 (Zavistovich, 1987d, p. 1). Three important conclusions were drawn from the NTIA's extensive testing of the Kahn and Motorola systems. First and foremost, the NTIA declared Motorola "a de facto standard" AM stereo

system (NTIA wants C-QUAM protected, 1987, p. 70). Secondly, the NTIA found multisystem receivers to be "technically but not economically feasible" (Clarion call to action, 1987, p. 5). And, finally, the agency suggested the FCC intervene to protect Motorola's stereo pilot tones[3] (NTIA wants C-QUAM protected, 1987, p. 70).

Al Sikes, Director of the NTIA, explained two of the three conclusions:

> There might still be some doubt as to whether it is the de facto standard. The fact that all radios can receive the C-QUAM signal makes it at the very least a de facto standard. . . . That would be the basis upon which I think it's clear that its pilot tone should be protected. (p. 70)

Sikes added that the Motorola pilot tone was recommended for protection rather than Kahn's because of Motorola's "far greater penetration" in the marketplace (p. 70). Leonard Kahn called the report a "blow" to his system's chances (p. 70).

In addition, the NTIA found a "clear market preference for C-QUAM AM stereo," and discovered "no interest in moving to a multisystem environment" (p. 74). Interestingly, and contrary to earlier industry beliefs, the NTIA concluded that multisystem receivers would cost no more to produce than single system units (p. 74). The NTIA urged AM broadcasters to "as quickly as possible, go to stereo" (p. 74).

Despite the NTIA's report, AM operators remained reluctant to go ahead with stereo. As of September 1987, Motorola tallied 500 stations to no less than 100 for Kahn (The AM conundrum, 1987, p. 130; Likely candidates for AM stereo, 1987, p. 75; Keeping the (Kahn) faith, 1987, p. 76). AM stereo was often compared to FM stereo. Glynn Walden, an engineering manager for Group W AM stations, explained:

> Although there weren't two competing systems, it was still hard to convince broadcasters to put in FM stereo generators in the late 1960's. FM technology just sat there for 10 years, then FM receivers got better, especially in cars. With AM stereo sitting

> there, receiver manufacturers will have good reason to eventually build quality receivers. Once there are at least 1,000 stations with AM stereo, receiver manufacturers will have no choice but to build better AM radio receivers, in general. (Likely candidates for AM stereo, 1987, p. 76).

The ball was clearly in the FCC's court. The Commission had to respond to the petitions and the NTIA study. But when? A year had passed since Texar and Press Broadcasting presented their documents to the FCC. The Commission acknowledged "the AM stereo issue has to be addressed with all due haste," and speculated on a fall 1987 finishing date (Zavistovich, 1987d, pp. 1, 3). The Commission later scheduled October 21 as the date it would release its AM stereo "statement" (AM stereo comment, 1987, p. 1), but postponed the report until Winter 1988 for no obvious reason (Zavistovich, 1987e, p. 1).

On September 15, 1987, Kahn Communications filed yet another in a line of complaints against Motorola, charging that in 1985 Motorola was in violation of patent law. In essence, company president Leonard Kahn claimed that he was issued a patent on a chip capable of decoding all existing AM stereo signals. Sony Corporation had at one point marketed a receiver incorporating the chip, therefore enabling the Kahn system to remain active. Motorola, too, claimed patent rights and warned Sony not to continue manufacture of the receivers containing the multi-decoding chip (Zavistovich, 1988, p. 7). As a result, Kahn believed Motorola "improperly blocked Sony from selling multisystem radios" (AM stereo, 1988, p. 10). Upon "reexamination of patent 4,184,046," the U.S. Patent Office on March 3, 1988, ruled Motorola to be the rightful holder of the patent (Zavistovich, 1988, p. 7). Sony had discontinued its line of multi-decoding receivers, but denied any pressure from Motorola. According to Sony officials, there was "a lack of demand for multisystem receivers" (Motorola Inc., 1988a, p. 3).

1988

On January 14, 1988, the FCC unanimously, and categorically, denied all petitions and pleadings for the Commission to protect Motorola's C-QUAM pilot tone, to require all receivers to contain multisystem decoding capability, and to re-consider its marketplace stance and select a standard . In addition, the FCC refused to declare Motorola's system the de facto AM stereo standard, but two of the three Commissioners[4] did unofficially indicate that the system was a de facto standard (FCC holds the line on AM stereo, 1988, p. 49).

Regarding the denial of protection of the Motorola pilot tone, the FCC explained:

> . . . establishing pilot tone protection and defining the relevant technical standards could be accomplished only in a rule making proceeding. The uncertainty and delay of further proceedings could thus discourage broadcasters, manufacturers, and listeners from investing in AM stereo in the interim, thereby hindering its development. (FCC, 1988, p. 405)

The FCC also disagreed with the petitioners' request to require all receivers to be multisytem decoders:

> Stereo is an optional, not required, service enhancement for AM radio stations. AM stations that choose to broadcast in stereo do so at their own discretion based on their determinations of what is most appropriate for their own markets. Consistent with our general policy of limiting our regulatory role regarding broadcast service enhancements, we find no compelling need to establish receiver requirements for AM stereo capability. (p. 405)

The FCC staunchly maintained that the marketplace was working, particularly in light of the overwhelming numbers of supporters of one system. In the opinion of the Commission, there was a clear broadcast industry preference "towards establishing a de facto standard" (p. 404). The Commission wrote:

> Petitioner's arguments and presentations do not convince us that Commission intervention at this late date would prove beneficial to the public. Rather, while only ten percent of all AM stations have installed stereo capability, the market is working towards the selection of an industry standard. . . . the field of competitors

> has narrowed and the majority of stations now choosing to broadcast in stereo seem to be selecting one particular technical system. Thus, there is no indication that the functioning of the marketplace does not reflect the level of AM stereo service desired by the public or that active encouragement of this service feature through mandatory standards setting would be an appropriate way to contribute to the improvement of the economic condition of the AM service. (p. 404)

In response to claims from petitioners that the FCC's failure to pick a standard negatively affected the proliferation of AM stereo, the Commission stated: ". . . we conclude that the rate at which broadcasters have chosen to install AM stereo capability cannot be attributed to our decision to not establish mandatory industry standards" (p. 404).

Further, the Commission expounded upon the disadvantages of reentering the picture to pick a standard from among Kahn and Motorola:

> If the first AM stereo proceeding is a guide, action by the Commission to select an AM stereo standard would be a lengthy process. Given the complexity of the issues and the strong interest of the competing parties, any decision made by the Commission probably would be followed by requests for reconsiderations and subsequent appellate litigation. During the course of such proceeding, the AM stereo market would be subject to a further uncertainty that would delay the introduction of service into the market. After all of this administrative delay, there still would be no guarantee that the standard selected would be any better than one the marketplace might choose. Thus, action by the Commission to choose an AM stereo standard would be expected to hinder, rather than promote, development of this service feature and would not benefit the industry or the public as petitioner predicts. (p. 404)

After years of hope that the FCC would reverse its stand and pick a standard, the Commission's rejection of all petitions placed the standards decision once and for all "squarely into the AM broadcaster's [sic] court" (An end to stereo wars, 1988, p. 5). Throughout the marketplace, many in the broadcast industry continued to believe the FCC would step in to pick a standard. Still, the FCC's reluctance to do so was disappointing, but hardly surprising.

To many broadcast executives, the FCC's refusal to intervene

was expected. Many even suggested the FCC still feared litigation (Hughes, 1988a, p. 3; Hughes, 1988b, p. 1), a widely believed suspicion dating back to the marketplace decision. Indeed, the Commission admitted as much. Motorola and a host of other parties, however, hoped the FCC's admission of a de facto standard would serve as a catalyst for a volume of sales. But, high expectations had often been crushed. Ed Anthony, a Broadcast Electronics engineer, explained: "There have been times when I thought there would be a great C-QUAM jump, and the ndustry produced a resounding yawn" (Hughes, 1988b, p. 1). Nonetheless, a "yawn" would prove the Commission's point -- that interest in a sound enhancement technology would be dictated by the marketplace no matter whether a standard existed or not. The matter was entirely up to the broadcast industry.

After Kahn's patent complaint case against Motorola ended unsuccessfully in March. Kahn waited very briefly before turning his attention to General Motors, the first receiver manufacturer to have aligned with Motorola in the marketplace. On April 29, 1988, Kahn "filed suit . . . in US District Court for the Southern District of New York against General Motors Corp., accusing the automobile giant of patent infringement on compatible AM stereophonic receivers" (Kahn files lawsuit against GM, 1988, p. 7). Kahn "sought royalty rates [of] 1.5% of the net selling price of subject receiver or 25 cents, whichever were greater," and requested a jury trial to hear the case (p. 7).

Less than a month later on May 27, Motorola in turn responded with a declaratory judgement filing against Kahn and partner Hazeltine in US District Court for the Northern District of Illinois" (Motorola files for AM stereo court action, 1988, p. 14). As reported in Radio

World: "Motorola asked the court to stop Hazeltine and Kahn from making claim on the patent against Motorola, GM or any other Motorola customers . . . . Motorola also requested that the court award the company court costs and legal fees" (p. 14). Kahn had often levied complaints against Motorola. For the first time, however, Motorola apparently decided enough was enough, and chose to return the favor.

By mid-year, Motorola's marketplace domination grew. Receiver manufacturers, possibly influenced by the FCC's acknowledgment of a possible de facto standard, began to show more and more confidence in C-QUAM. Ford and General Motors announced that most of their cars and trucks would contain AM stereo receivers as standard equipment. Even more importantly, Chrysler revealed that beginning with the 1989 models, all of their cars would be C-QUAM equipped. Estimated totals demonstrated the success of Motorola in the marketplace: "28% of all foreign and domestic new cars" came with C-QUAM AM stereo; 30 manufacturers produced about 50 different C-QUAM receiver models; at least 16 million existing C-QUAM AM stereo receivers; and, a more versatile version of the integrated circuits ensured the manufacture of even more receivers (Motorola Inc., 1988b, pp. 1-2).

The year 1989 ended much the same as all the others in the marketplace era. There were still many questions and few answers. Yet, it appeared Motorola would gradually be able to smother the hopes of Kahn. With a virtual lock on the receiver industry, it appeared that those AM operators inclined to add stereo capability would have little option other than Motorola.

Summary

Throughout the first seven years of the AM stereo marketplace, the FCC maintained its hands-off policy and intervened only to police

technical violations and complaints. The Commission envisioned the marketplace as the quickest way to get AM stereo to the consumer.

Soon after Delco chose Motorola as the standard for its receivers, nearly 40 other manufacturers followed. No receiver manufacturers aligned themselves with any other company.

Eventually, Sony and Sansui introduced receivers capable of decoding of all five systems, which were surprisingly rejected by the marketplace. The price of the units was higher than that of Motorola-only receivers, but the difference was rather insignificant considering the product capabilities. Perhaps the head start by Motorola had more to do with the failure of multisystem receivers than any other factor.

Within the first two years of the marketplace, three of the five systems were eliminated, leaving only Motorola and Kahn. As Motorola slowly gained favor in the marketplace, Kahn's system remained status quo at best. In fact, several stations in major markets deserted Kahn for Motorola, citing listener discontent for the switch. Still, the total number of AM stereo-equipped stations remained relatively small. The number of AM stereo stations reached about 650 by the end of 1988 -- or, about 10 perent of all AM stations.

Often, apparent AM stereo progress was hindered. For instance, when Harris removed its system from the market and aligned with Motorola, Kahn took objection and filed an antitrust suit with the FTC. The case was dismissed.

Later, Kahn accused Motorola of FCC technical violations. After investigating and clearing Motorola, the FCC, too, was attacked by Kahn. The result, a Freedom of Information Act filing for the release of the test results. Eventually, the results were made public.

In 1987, Kahn charged Motorola with patent violations. Again,

the claim was dismissed. In response, Kahn chose to pursue action against Motorola's biggest ally -- General Motors' Delco.

In addition to formal complaints against Motorola and receiver manufacturers, Kahn persistently attacked the firm through industry-wide mail and media campaigns. While Kahn may have slowed Motorola's progress immeasurably, he did nothing to improve the standing of his own system. While in a sense Kahn's determination at one point may have been admired and perhaps appreciated, it appeared the broadcast industry in general may have become weary of Kahn's persistence -- preferring instead to proceed with AM stereo in an attempt to resurrect the fortunes of AM radio.

The AM stereo marketplace degenerated into a mud-slinging Kahn vs. Motorola war of words, tired of the lack of marketplace success. Several companies and a federal agency leaped into the process in attempts to expedite the solution. Texar delivered a petition to the FCC asking for a standards decision.[8] The company acknowledged the limited success of the marketplace in eliminating three of five systems. However, Texar officials emphasized the detrimental effects the Kahn-Motorola battle had on retarding the growth of AM stereo.

Press Broadcasting also petitioned the FCC, not for a system standard, but to require all receivers to be multidecoders. The Commission could act on selecting a standard transmission system, but in reality only Congress could act on receiver requirements. When the Commission responded in 1988, it indicated that receiver manufacturers had the privilege of making their own decisions concerning stereo or other enhancements.

Meanwhile, the NTIA became involved. After conducting two different studies, the agency determined that Motorola a de facto AM

stereo standard -- not the de facto standard. The NTIA conclusion damaged Kahn's prospects of becoming the standard. The FCC acknowledged the NTIA's findings and concurred that enough evidence existed to confirm the marketplace was working toward a de facto standard.

The FCC carried out its obligations to comment on the Texar and Press petitions, as well as the NTIA study. The FCC's categorical response addressed all the pertinent issues and maintained its stand. After seven years in the marketplace the FCC concluded that the benefits of staying out of the matter far outweighed the negatives.

Conclusion

The FCC originally sent the AM stereo decision to the marketplace out of confusion and desperation. It appeared that several of the Commissioners involved in the decision would have preferred to pick a standard. Yet, they voted for the marketplace for a variety of reasons. Only one Commissioner and Chairman Mark Fowler were totally in favor of a marketplace decision. Of the remaining Commissioners, three preferred a standard but bowed to marketplace pressure because they believed the FCC and all its attendant researchers incapable of picking the proper system. The other Commissioner believed the Magnavox decision should have stood. Discontentment with the reversal led to marketplace support. The uncertain role of the Commission during deregulation affected AM stereo, particularly since both proceedings were being handled by the FCC simultaneously. Never before had the Commission failed to set a standard.

In making the decision, the FCC said it was confident the marketplace would be able to make a better standards choice than the Commission. If the Commission believed the marketplace was better than

governmental standard-setting, surely it became obvious over time the marketplace was not producing the FCC's desired results. Texar recognized the stalemate, as did Press, the National Black Media Coalition, and the NTIA. Why, then, did the FCC not see the problem? Perhaps it did. If litigation scared the Commission during its original AM stereo proceeding, the FCC should have faced the possible consequences then. Years later, however, it was inevitable the Commission would have risked much by trying to rectify its mistake. Certainly, any legal proceeding would have focused on the FCC's original reluctance to set a standard, particularly if the stand were reversed.

Examination of the three member Commission who responded to the petitions suggested no further intervention would take place. Of the three, James Quello was the only remaining Commissioner who had taken part in the original proceeding. The new Chairman, Dennis Patrick, was the handpicked successor to staunch marketplace supporter Fowler. And, the third member, too, believed in the marketplace.

The Commission should have stood up to Kahn and all others in the beginning. Surely the courts would have solved the problem more rapidly than the marketplace. There was still time in 1988 for the Commission to have taken on any legal challenge. Kahn, in particular, was saddled with a lack of market acceptance and a dismal legal track record. With six decades of regulatory history behind it, the FCC would surely stand the test of any legal action.

If lost credibility were a problem, the Commission should have taken steps to rectify its mistake by admitting the failure of the marketplace when the matter was reopened in 1988. By resuming its sound, historical traditions of strict broadcast control demanded by

the broadcast industry since the 1920s, the Commission may have finally regained the respect it lost in 1982.

AM stereo appeared at times to be losing its luster and appeal to many in the broadcast industry. Continuous delays in the development of AM stereo and rapid advancements in other attractive technologies combined to disillusion even the most important players. However, with the present realization that the FCC certainly can never again reconsider its position, the broadcast industry must now take charge and control its destiny.*

Nonetheless, success for AM radio is possible. The FCC has before it a number of proposals and plans to enhance the overall technical performance of the medium, which the Commission has indicated will be implemented in some form. Precedent exists for an AM comeback. FM had stereo capability for nearly 20 years before competing effectively with AM. With stereo transmission having been available for only seven years, time remains for a reversal in AM fortune.

NOTES

[1] The FCC's dilemma was compounded by a serious technological inconsistency. Each of the five proposed AM stereo systems "is basically similar" in meeting uniform broadcast standards, such as compatibility with existing mono AM equipment (FCC, 1978, p. 3). However, the basic difference in each is that stereo is transmitted differently, making receiver incompatibility the major disadvantage of all the systems. For example, "a signal coded by the Belar system cannot be used by a Harris-circuit radio" (Hawkins, 1980, p. 47). "A radio with four decoders" would be necessary to be sure of getting stereo sound" (p. 47).

[2] Originally, five systems were approved to broadcast AM stereo: Magnavox, Belar, Kahn, Motorola, and Harris. However, in 1981 prior to the marketplace decision, Belar elected to withdraw from any further participation in the AM stereo battle. The feeling at Belar was that any effort would be futile. President Arno Meyer succinctly stated, "We didn't want to keep pouring money down the bottomless pit" (AM stereo gets another, 1981, p. 84).

[3] Pilot tones are signals which light the stereo indicators of AM stereo receivers. The pilot tone has often been the object of controversy in the marketplace. Frequently, stations using a transmitter other than Motorola's would nonetheless use that system's pilot tone to light the indicators in the consumer's receiver. The goal was to make the listener believe he/she was picking up an AM stereo broadcast without actually doing so. With FCC protection, such abuse could be eliminated.

[4] In the early 1980s, the number of FCC Commissioners was reduced from seven to five members. At the time of the AM stereo petition review, two seats were empty.

[5] During December 1985, the National Black Media Coalition (NBMC) announced it had "asked the FCC to reexamine the AM stereo standard issue," primarily because of marketplace failure. NBMC counsel David Honig explained: "Too much time has been wasted waiting on a marketplace that won't budge, and the audience and AM broadcasters are hurting as a result" (Hughes, 1985, p. 6). Honig contended "no economic incentives" existed to prompt broadcasters to unite behind one system (p. 6). As a result, he said, none of the stations already using AM stereo would be willing "to give up the ship and go with the other system" (p. 6). The FCC never responded to the petition.

[6] During Congress' final 1988 session, "Rep. Matthew Rinaldo (R-NJ) introduced the AM Radio Improvement Act (HR-5499)" during the last hours of the last session (Gatski, 1988, p. 1). Because of timing the bill had no time to make it through the legislative process. However, it was almost certain the bill would be reintroduced in 1989. The purpose would be to "require the FCC to begin deliberations on selecting a standard within 60 days and choose an AM stereo standard within six months after the legislation goes into effect" (p. 1).

REFERENCES

Abramson, D. (1982, May 3). Long delay predicted for AM stereo solution. Television/Radio Age, p. 33-35, 75-76.

AM broadcasters: Anxious for stereo. (1985, April 22). Broadcasting, pp. 95-96.

The AM conundrum [Editorial]. (1987, September 7). Broadcasting, p. 130.

AM stereo. (1988, April 18). Broadcasting, p. 10.

AM stereo comment coming. (1987, October 1). Radio World, pp. 1, 3.

The AM stereo fight continues. (1986, April 21). Broadcasting, pp. 68, 70.

AM stereo gets another hearing. (1981, February 16). Broadcasting, pp. 84-85.

AM stereo goes on the air: Fighting for equality between the radio bands. (1982, August 2). Broadcasting, pp. 23-24.

AM stereo makers tout their wares. (1984, September 24). Broadcasting, pp. 56, 58.

The AM stereo marketplace struggles for a standard. (1984, March 19). Broadcasting, pp. 84-86.

AM stereo on parade at CES. (1983, January 17). Broadcasting, pp. 116, 118.

The AM stereo question: Motorola or multisystem? (1984, May 7). Broadcasting, pp. 95-97.

AM stereo support eroding [Editorial]. (1986, August 1). Radio World, p. 5.

An end to stereo wars [Editorial]. (1988, February 1). Radio World, p. 5.

Clarion call to action [Editorial]. (1987, September 1). Radio World, p. 5.

C-QUAM violations alleged. (1986, May 1). Radio World, p. 1.

Delco AM stereo tests near end. (1982, October 2). Billboard, p. 22.

Fall RADAR study finds FM continuing to grow. (1982, December 18). Billboard, p. 11.

FCC. (1977, July 7). AM stereophonic broadcasting: Inquiry (Docket No. 21313; FCC 77-445). Washington, DC: Federal Register, pp. 34910-34913.

FCC. (1978, October 19). In the matter of AM stereophonic broadcasting: Notice of Proposed rule making (Docket No. 21313; FCC 78-638). Washington, DC: Author, pp. 1-29.

FCC. (1980, September 11). In the matter of AM stereophonic broadcasting: Memorandum opinion and order and further notice of proposed rulemaking (Docket No. 21313; FCC 80-477). Washington, DC: Author, pp. 1-32.

FCC. (1982, March 18). In the matter of AM stereophonic broadcasting: Report and order (proceeding terminated) (Docket No. 21313; FCC 82-111). Washington, DC: Author, pp. 1-32.

FCC. (1988, January 28). In the Matter of AM stereophonic broadcasting: Memorandum opinion and order. (FCC Record 3, (2) FCC 88-16). Washington, DC: United States Government Printing Office, pp. 403-406.

FCC acquits C-QUAM. (1986, August 1). Radio World, pp. 1, 10.

FCC asked to choose AM stereo standard. (1986, September 29). Broadcasting, pp. 35-36.

FCC gives up on AM stereo choice, will leave it to marketplace. (1982, March 8). Broadcasting, pp. 36-37.

FCC holds the line on AM stereo. (1988, January 18). Broadcasting, p. 49.

FCC prescribes major treatment for AM 111s. (1986, April 17). Broadcasting, pp. 35-36, 38.

FCC pulls plug on Harris AM stereo. (1983, August 29). Broadcasting, pp. 35-36.

FM share up to 70%. (1985, June 14). Radio and Records, p. 1.

Fogarty: Favors rapid approval for DBS petitions. (1982, April 5). Television/Radio Age, pp. 68-69.

FTC said to be investigating Motorola on antitrust grounds. (1985, March 11). Broadcasting, p. 42.

Garvey, D.E. (1980, Fall). Introducing color television: The audience and programming problem. Journal of Broadcasting, 24 (4), 515-525.

Gatski, J. (1988, December 1). Congressional action slated for AM stereo? Radio World, pp. 1, 17.

Gave, K.. (1984, August 20). AM stereo tunes in better sound and bigger profits: Big three expand use of AM stereo on 1985 models.

Automotive News, p. E-22.

Hall, D.E. (1982a, May 15). Delco in-car tests seem key to AM stereo choice. Billboard, pp. 1, 20.

Hall, D.E. (1982b, December 18). Motorola wins AM stereo test: But marketplace may not go with Delco's choice. Billboard, pp. 11, 62.

Harris Corporation. (1984, December 17). Harris signs AM stereo licensing agreement with Motorola. (Available from Harris Corporation, P.O. Box 4290, Quincy, Il 62305.

Harris throws its weight behind Motorola. (1984, December 31). Broadcasting, p. 109.

Hawkins, W.J. (1980, July). AM stereo -- FCC approves a system. Popular Science, p. 47.

Hedegaard, E. (1982, April 29). AM stereo approved; no threat to FM yet. Rolling Stone, p. 49.

Herwitz, T.R. (1985, December 9). Inside the FCC. Television/Radio Age, pp. 185-186.

Holland, B. (1983, September 3). Discrepancies cited: FCC tells Harris to withdraw its AM stereo system. Billboard, p. 14.

Hughes, D. (1985, December 15). RAC unveils AM 'wish list'. Radio World, pp. 1, 6.

Hughes, D. (1986a, August 1). Marketplace ruling sought. Radio World, pp. 1, 4.

Hughes, D. (1986b, September 1). Kahn seeks FCC test results. Radio World, p. 3.

Hughes, D. (1986c, October 1). FCC reveals AM stereo data. Radio World, pp. 3, 6.

Hughes, D. (1986d, October 15). Group W AMs to go C-QUAM. Radio World, p. 3.

Hughes, D. (1987a, February 15). AM stereo action awaits NTIA study. Radio World, p. 8)

Hughes, D. (1987b, May 1). FCC may move on AM stereo. Radio World, pp. 1, 4.

Hughes, D. (1988a, February 1). FCC reaffirms stereo stand. Radio World, pp. 1, 3.

Hughes, D. (1988b, February 15). No surprises in AM stereo. Radio World, p. 1.

Jones: Staunchly backs marketplace philosophy. (1982, April 5). Television/Radio Age, pp. 70-71.

Josephson, S. (1982, December 13). Future strategy for successful AM stations: Programming experimentation to fill market voids. Television/Radio Age, pp. 44-45 & 119-120.

Kahn fights for stereo AM. (1985, August 5). Television/Radio Age, pp. 30-31.

Kahn files lawsuit against GM. (1988, June 1). Radio World, p. 7.

Kahn, L.R. (1984, December 17). In the running [Letter to the editor]. Broadcasting, p. 26.

Keeping the (Kahn) faith. (1987, September 7). Broadcasting, pp. 76,78.

Likely candidates for AM stereo. (1987, September 7). Broadcasting, pp. 75-76.

Lineback, J.R. (1982, April 21). AM stereo gets no standard. Electronics, pp. 48, 50.

McKerns, J.P. (1976-77). Industry skeptics and the Radio Act of 1927. Journalism History, 3 (4), pp. 129-131, 136.

Motorola appears to be leading in AM stereo race. (1984, April 2). Television/Radio Age, pp. 44, 94-95.

Motorola Inc. (1986a, March). C-QUAM AM stereo: Questions and answers for the consumer. (Available from Motorola Inc., 1216 Remington Road, Schaumberg, Il 60195).

Motorola Inc. (1986b, August). C-QUAM AM stereo receivers on the market as of August 1986. (Available from Motorola Inc., 1216 Remington Road, Schaumberg, Il 60195).

Motorola Inc. (1988a). Motorola C-QUAM AM stereo bulletin. (Available from Motorola Inc., 1216 Remington Road, Schaumberg, Il 60195).

Motorola Inc. (1988b). Motorola C-QUAM AM stereo bulletin. (Available from Motorola Inc., 1216 Remington Road, Schaumberg, Il 60195).

Multisystem AM stereo receivers: A solution to the marketplace problem? (1983, April 18). Broadcasting, pp. 95-96.

NAB '85: Getting technical in Las Vegas. (1985, April 29). Broadcasting, pp. 42, 44, 46, 48, 50, 52, 54, 56, 58, 60.

Norberg, E. (1984, March 5). What broadcasters must do to make sure AM stereo flies. Broadcasting, p. 30.

NTIA has AM study. (1987, August 15). Radio World, pp. 1, 5.

NTIA wants C-QUAM protected. (1987, August 17). Broadcasting, pp. 70, 74.

Petras, F. (1982, September). Car stereo: Coming attractions. Stereo Review, p. 22.

Popular demand. (1985, March 25). Broadcasting, p. 7.

Quello: Worried about future 'glut' in TV services. (1982, April 5). Television/Radio Age, pp. 64-65, 124.

Rivera: Pessimistic about increasing minority ownership. (1982, April 5). Television/Radio Age, pp. 74-75, 120.

Ronaldi, L.P. (1985, May 1). AM stations convert to C-QUAM. Radio World, pp. 1, 4.

Salsberg, A. (1982, June). Copping out [Editorial]. Popular Electronics, p. 6.

Scratch One. (1986, January 27). Broadcasting, p. 7.

Staying up. (1984, December 17). Broadcasting, p. 7.

Stereo AM: Coming soon. (1982, June). Stereo Review, p. 58.

Stereo showdown? (1982, August 9). Broadcasting, p. 7.

Sterling, C.H. (1982, Autumn). The FCC and changing technological standards. Journal of Communication, 32 (1), 137-147.

Sweeney, D. (1984, October). What's new. Stereo Review, pp. 71-75, 115.

Technological cornucopia at NAB '83. (1983, April 25). Broadcasting, pp. 82-87.

Two left. (1984, November 26). Broadcasting, p. 7.

Two left in AM stereo battle royal. (1984, December 17). Broadcasting, pp. 40-41.

Washburn: Proud of role in dish size reduction. (1982, April 5). Television/Radio Age, pp. 66-67, 120.

Week one of AM stereo: Jockeying for position at the starting gate. (1982, March 15). Broadcasting, pp. 52, 58.

Wytkind, E. (1986a, March 1). FTC clears Motorola of violations. Radio World, p. 3.

Wytkind, E. (1986b, June 15). Kahn, Tohtsu sign. Radio World, p. 11.

Zavistovich, A. (1987a, March 1). NTIA study urges multimode. Radio World, p. 1.

Zavistovich, A. (1987b, May 15). Slow start for NTIA study. Radio World, pp. 1, 4.

Zavistovich, A. (1987c, June 15). NTIA study finally underway. Radio World, p. 10.

Zavistovich, A. (1987d, September 15). AM stereo awaits FCC action. Radio World, pp. 1, 3.

Zavistovich, A. (1987e, November 1). FCC postpones stereo action. Radio World, p. 1.

Zavistovich, A. (1988, April 1). Kahn patent complaint denied. Radio World, p. 7.